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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,362	08/19/2003	Mark Christofis	46107-0089	4809

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EXAMINER

ALEXANDER, MICHAEL P

ART UNIT

PAPER NUMBER

1742

DATE MAILED: 03/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/643,362	Applicant(s) CHRISTOFIS ET AL.	
	Examiner Michael P. Alexander	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 25-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim(s) 1-35 is/are pending.

Election/Restrictions

Claims 25-35 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 31 August 2005.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Masayuki Kayahara (JP355065320A).

Regarding claim 1, Kayahara teaches (abstract, Figure 3) a method of induction heat treatment, comprising the steps of: selecting an article (1) for heat treatment having a longitudinal axis of rotation and an outer surface having an upper section, a lateral section and a lower section, and comprising a plurality of points having a plurality of normal spacings from the axis of rotation; selecting an induction coil (7) comprising a semi-cylindrical upper coil portion (9), a semi-cylindrical lateral coil portion (8), a semi lower coil portion (9') and having a longitudinal axis, the coil receiving therein the article for heat treatment and inherently producing, when energized a magnetic field having a

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non-planar centerline; placing the article within the induction coil; rotating the article within the induction coil at a selected speed; energizing the induction coil to apply the non-planar magnetic field and produce induction currents within the outer surface to a heat treatment temperature to at least a selected case depth; and cooling the outer surface of the article to a temperature to the selected case depth.

Regarding claim 14, Kayahara teaches (abstract, Figure 3) that during the step of energizing, the upper coil portion produces an upper magnetic field that is adapted to act on the upper section of the outer surface, the lateral coil portion produces a lateral magnetic field that is adapted to act on the lateral section of the outer surface, and the lower coil portion produces a lower magnetic field that is adapted to act on the lower section of the outer surface.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kayahara as applied to claim 1 above, and further in view of JP62047456A.

Regarding claim 2, Kayahara does not specify that the article (crank-shaft) would comprise of a pearlitic/ferritic steel. However, JP62047456A teaches (abstract) a steel composition having a matrix of two phase of fine ferrite and pearlite and teach that it would be suitable for use in crank-shafts. It would have been obvious to one of ordinary skill in the art to modify the method of Kayahara by using a steel composition having a matrix of two phase of fine ferrite and pearlite because such composition is suitable for use in crank-shafts as taught by JP62047456A.

Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kayahara in view of JP62047456A as applied to claim 2 above, and further in view of the ASM Handbook, Volume 4.

Regarding claim 3, Kayahara does not specify that the heat treatment temperature would be greater than the austenite transition temperature. However, the ASM Handbook, Volume 4, teaches (pages 16-17) in a method of induction hardening that it is necessary to transform to austenite because austenite is the starting structure for induction hardening. It would have been obvious to one of ordinary skill in the art to modify the method of Kayahara by heating to greater than the austenite transition temperature in order to transform to austenite because austenite is the starting structure for induction hardening as taught by the ASM Handbook.

Regarding claim 4, Kayahara teaches (abstract) quenching the article.

Regarding claim 5, Kayahara does not specify cooling to lower than the martensite transformation temperature. However, the ASM Handbook, Volume 4, teaches (page 9) forming martensite in steel during cooling because martensite is the hardest constituent in steels. It would have been obvious to one of ordinary skill in the art to modify the method of Kayahara by forming martensite in steel during cooling because martensite is the hardest constituent in steels as taught by the ASM Handbook.

Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kayahara as applied to claim 1 above, and further in view of Yamamoto et al. (US 6,227,979 B1).

Regarding claims 6 and 16, Kayahara does not specify that the article would be an inner ball race of a Rzeppa constant velocity joint having a barrel-shaped outer surface with a plurality of longitudinally extending arch-shaped grooves formed therein. However, Yamamoto teaches (Fig. 5, col. 5 lines 21-33, col. 7 lines 45-57) applying an induction hardening treatment to a Rzeppa constant velocity joint having a barrel-shaped outer surface with a plurality of longitudinally extending arch-shaped grooves formed therein in order to provide the parts with strength necessary for transmitting the torque. It would have been obvious to one of ordinary skill in the art to combine the method of induction heat treating method of Kayahara with the Rzeppa constant velocity joint induction heat treating method of Yamamoto in order to provide the parts with strength necessary for transmitting the torque as taught by Yamamoto.

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Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kayahara in view of Yamamoto as applied to claims 6 and 16 above, and further in view of JP62047456A.

Regarding claims 7 and 17, see the rejection of claim 2 above.

Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kayahara in view of Yamamoto and JP62047456A as applied to claims 7 and 17 above, and further in view of Favenyesi et al.

Regarding claims 8 and 18, Kayahara in view of Yamamoto and JP62047456A does not specify that the steel would be AISI 1050 steel. However, Favenyesi teaches (abstract) a method of induction hardening AISI 1050 steel in order to create a fatigue resistant induction hardened microstructure. It would have been obvious to one of ordinary skill in the art to modify the method of Kayahara in view of Yamamoto and JP62047456A by using AISI 1050 steel in order to create a fatigue resistant induction hardened microstructure as taught by Favenyesi.

Claims 9-12 and 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kayahara in view of Yamamoto and JP62047456A as applied to claims 7 and 17 above, and further in view of the ASM Handbook, Volume 4.

Regarding claims 9 and 19, see the rejection of claim 3.

Regarding claims 10 and 20, Kayahara does not specify austenitizing at a temperature of 1700-2000. However, the ASM Handbook, Volume 4, teaches (Table 4 on page 185) that required austenitizing temperature during induction heat treating is a function of the amount of carbon and carbide-forming elements contained in the steel.

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Since austenitizing temperature is a result-effective variable as taught by the ASM Handbook, it would have been obvious to one of ordinary skill in the art to modify the method of Kayahara by selecting the desired austenitizing temperature as a routine optimization of the carbon and carbide-forming elements as taught by the ASM Handbook. See MPEP 2144.05 II.

Regarding claims 11 and 21, Kayahara teaches (abstract) quenching the article.

Regarding claims 12 and 22-23, see the rejection of claim 5 above.

Claims 13 and 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kayahara in view of Yamamoto, JP62047456A and the ASM Handbook, Volume 4 as applied to claims 12 and 23 above, and further in view of Kim et al. (KR2001025964A).

Regarding claims 13 and 24, the combination of reference do not specify stopping the quenching when the outer surface of the inner race is less than or equal to T_c to the selected case depth, and then permitting the inner race to cool under ambient conditions. However, Lee teaches (abstract) in a method of heat treating steel, stopping a quenching after 90 seconds and then air cooling and teaches the result of improved fatigue resistance. It would have been obvious to one of ordinary skill in the art to modify the method of the cited combination of references by stopping the quenching after 90 seconds (i.e. when the outer surface of the race is less than or equal to T_c to the selected case depth) and then air cooling (i.e. permitting the inner race to cool under ambient conditions) in order to improve the fatigue resistance as taught by Lee et al.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kayahara as applied to claim 14 above, and further in view of the ASM Handbook, Volume 4.

Regarding claim 15, Kayahara teaches (abstract) the induction coil would be a high frequency induction coil but do not specify the frequency. The ASM Handbook, Volume 4, teaches (page 167) that high frequency systems are 10 kHz and up. It has been held that when a prior art range overlaps with claimed range, this would be evidence of prima facie obviousness. See MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art to modify the method of Kayahara by selecting an induction coil frequency of 10 kHz and up because the ASM Handbook teaches the same utility throughout the disclosed range.

Response to Arguments

Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Alexander whose telephone number is 571-272-8558. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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